ARMREST SUPPORT

FIELD OF THE INVENTION

The present invention relates to armrest supports and in particular to armrest support which are adjustable in height and allow adjustment of the angle of the armrest support.

BACKGROUND OF THE INVENTION

Many different types of adjustable armrest support have been proposed where the armrest is adjustable in height as well as angle. Some of these structures have a single lock mechanism that allows adjustment of both height and angle by release of a single lever.

A common approach is to use a lock arrangement having at least one pin receivable in any hole of a series of holes for locking of the armrest column at a particular height. With this type of structure, there is a separate armrest angle adjustment provided at the top of the armrest support for varying the angle of the armrest relative to the axis of the column support. A lever and control linkage arrangement allows for release of the lock mechanism to allow adjustment of the height of the column support.

United States Patent 5,749,628 discloses a spring loaded pawl member engageable with a ratchet surface provided on the exterior of a column to allow adjustment of the height of the arm. The pawl is spring loaded against the ratchet surface and is moveable by means of a lever to a release position. The angle adjustment of the arm is provided by a separate locking arrangement provided at the top of the column. The adjustable arm of United States Patent 5,749,628 uses a support column of a rectangular configuration with the arm holder slideable

on this rectangular bar configuration. With this arrangement all adjustment of the arm must occur at the top surface of the adjustable arm support.

There are a series of adjustable height armrest supports which have a first lock arrangement for adjusting and locking the height of the armrest and a spring detent type lock arrangement provided at the upper surface of the column. Basically the arms are free to assume a different angular position if sufficient force is applied to move the spring detent from one locking position to a different locking position.

It is desirable to provide a simple height adjustable armrest support which also accommodates adjustment in the angle of the armrest. Furthermore, it would be desirable to provide such a system which can be adapted to accommodate different mounting angles of the armrest relative to the chair seat. Thus the armrest can be angled slightly outwardly or inwardly as well as forwardly and rearwardly as necessary for a particular style of chair.

SUMMARY OF THE INVENTION

An adjustable in height armrest according to the present invention comprises a tubular armrest column, a tubular armrest carrier adapted to telescope relative to the armrest column for adjusting the height of the armrest, an arm support located on top of said armrest carrier and a releasable locking system for securing the armrest column relative to the armrest carrier in one of a series of positions where each position defines a fixed height of the armrest and a fixed angular orientation of the arm support relative to a longitudinal axis of the armrest column. With this arrangement, the height of the armrest and the angle of the arm support relative to the

longitudinal axis of the armrest column are adjustable. The releasable locking system includes two locking members carried by the armrest carrier and releasably engageable with locking recesses provided in an outer surface of the armrest column on opposite sides thereof. The locking system further includes a lock release member having a spring bias urging said lock release member to a locking position, said lock release member in said locking position forcing said locking members into engagement with said locking recesses to secure said armrest at a fixed height and angle. The lock release member when moved against the spring bias to a release position frees the locking members to move and disengage said locking recesses thereby allowing adjustment of the height and angular position of the arm support about the axis of the tubular armrest column.

BRIEF DESCRIPTION OF THE DRAWINGS

The above as well as other advantages and features of the present invention will be described in greater detail according to the preferred embodiments of the present invention in which;

Figure 1 is a perspective view of the adjustable armrest column;

Figure 2 is an exploded perspective view showing different components of the armrest;

Figure 3 is a side view showing the height adjustability range of the armrest column;

Figure 4 is a sectional view through the armrest column;

Figure 5 is a side view of the armrest column;

Figures 6a and 6c are a sectional views through the armrest column showing the tubular armrest column and locking surfaces provided thereon;

Figures 6b and 6d are enlarged views of the locking and release of the armrest;

Figure 7a is a sectional view through the locking members of the armrest column of Figure 6;

Figure 7b is an enlarged view of the components within the circle of Figure 7a;

Figure 8a is an exploded assembly drawing of the armrest column of Figure 7;

Figure 8b is a partial perspective view of the locking surfaces on the armrest column;

Figure 8c is a perspective view of one of the locking members;

Figures 9 through 11 are sectional views through the locking members of the armrest column showing the angular adjustment thereof; and

Figures 12 through 14 are partial side views showing different mounting plates secured to the bottom of the tubular armrest column.

DETAILED DESCRIPTION ACCORDING TO THE PREFERRED EMBODIMENTS OF THE PRESENT INVENTION IN WHICH:

The height adjustable armrest 2 as shown in Figures 1 and 2 has a tubular armrest column 4 which slidably receives to the exterior thereof the tubular armrest carrier 6. The tubular armrest carrier 6

includes at an upper surface the top flange 8 which mechanically receives the arm support 10. The tubular armrest carrier 6 is only partially rotatable about the axis of the tubular armrest column due to the outwardly projecting keys 42 and 44 being limited within key slots 46 and 48 provided in the armrest carrier 6.

The armrest carrier 6 includes opposed ports 28 for receiving the opposed locking members 26. The locking members 26 when forced inwardly against the armrest column 4 will engage the locking surfaces 38 and 40 provided on the armrest column 4. (See Fig.6)

A movable lock sleeve 18 cooperates with the collar 20 which is fixed to the top flange 8 of the armrest column 4. The spring 22 forms a bias urging the movable lock sleeve 18 to a locked position as generally shown in Figure 4. The lock sleeve includes a stop tab 60 forming the bottom position of the lock sleeve relative to the armrest column 4. Movement of the movable cover 18 by the user forcing the tab 19 to move within the slot 21 of the cover column 20, allows the opposed locking members 26 to move outwardly.

In the locked position of Figure 4 the cover 18 is pressing on the outside surface of the locking members 26 and forcing them into engagement with the locking surfaces 38 and 40 of the armrest column 4. The slight movement of the cover 18 upwardly releases contact of the cover with the locking members which can move marginally outwardly to a clear position within the enlarged cavity 65. The locking members 26 are maintained within the ports 28 of the tubular armrest carrier 6 by the enlarged cavity 65. Release of the tab 19 forces the lock sleeve 18 to move downwardly and forces the locking members 26 into engagement with the locking surfaces of the armrest

column 4. The locking surfaces 38 and 40 are oversized in width to correspond to any angular adjustment of the armrest column. Thus movement of the lock sleeve 18 upwardly allows both telescopic movement of the armrest column 4 relative to the armrest carrier 6 and it also allows limited angular movement of the carrier 6 relative to the axis of the column 4. This movement is limited due to the cooperation of outwardly projecting keys 42 and 44 with key slots 46 and 48.

An upholstered or plastic armrest can be attached to the plate 10. In addition, the base of the height adjustable armrest 2 is the mounting plate 50 which is secured to the lower end 5 of the tubular armrest column 4. The angle of the plate relative to the axis of the column 4 can change and as shown in Figures 12 and 13 the shape of the plate can change to accommodate different chair seats. This also allows the angle of the column from side to side as well as front to back to vary according to the particular plate. This is a convenient approach to accommodate different chair designs using the same height adjustable armrest assembly.

In the height adjustable armrest 2 of Figures 2 and 4 the locking surface 38 is a series of vertical ribs, which are engaged, by a series of vertical ribs or projections on the corresponding locking member 26. The opposite locking surface 40 is a series of horizontal ribs and these engage the horizontal ribs of the locking member 26. As can be appreciated one of these locking members limits and locks against angular movement of the armrest column 4 relative to the armrest carrier 6 and the opposite locking member locks the height adjustment.

The series of Figures 6, 7 and 8 show a different arrangement for locking of the height adjustable armrest.

In this case, the locking surfaces 38 and 40 provided on the armrest column 2 are a series of inwardly extending pyramid shaped cavities 39. The locking members 26 include a series of pyramid type projections 27 with each locking member 26 having a series of vertically aligned pyramids as well as a series of adjacent horizontal pyramids. These pyramid projections form both rows and columns of projections. This type of locking member can also be used with the arrangement of Figure 1. The pyramid projections align and nest with the pyramid shaped cavities on the armrest column. These projections form an automatic aligning mechanism assuring a smooth and easily controlled height adjustment of the armrest column. These surfaces provide small cam surfaces urging the locking members outwardly when the carrier has been moved to the clear position. The carrier in the locked position maintains a positive connection with little tolerance. Thus the user is able to fix the height and angle of the armrest in a host of positions while maintaining an acceptable tolerance.

In Figures 6a and 6b the adjustable armrest 2 is in a locked position. The locking members 26 are in engagement with the locking surfaces 38 and 40 on the armrest column 4. The armrest carrier 6 is therefore in a fixed height angle position relative to the armrest column 4. The arm support 10, as it is secured to the top flange 8 of the armrest carrier 6 is similarly at a fixed height and angle.

The moveable lock sleeve 18 is biased by the spring 22 to a locked position. This locked position is defined by the restricted cavity 91 forcing locking members 26 into engagement with locking surfaces 38 and 40.

The restricted cavity 91 includes a cam or transition surface 93 leading to the enlarged cavity 65.

The lock sleeve 18 has been moved to the release position in Figures 6c and 6d such that the locking members 26 have moved outwardly into the cavity 65 and are clear relative to the locking surfaces 38 and 40. Movement of the arm support 10 to adjust the height or angle will also assist in the locking members moving to the release position.

Release of the locking sleeve 18 causes restricting cavity 91 to engage the locking members 26 and provide an inward bias. This inward bias encourages the pyramid projections 27 of the locking member to engage the pyramid cavities 39 of the locking surfaces and align as necessary to assume a locked position. As can be appreciated the armrest carrier 6 and the lock sleeve 18 move together during both height and angular adjustment of the armrest 2.

As shown in Figures 7a and 7b the cavity 91 is sized to force locking members 26 to fully engage the locking surfaces 38 and 40.

As shown in Figure 8a the locking surfaces 38 and 40 are oversized in both height and width to allow for the maximum height adjustment as well as to allow for the maximum angular adjustment at all height positions. These locking surfaces accommodate a maximum rotation of the arm of approximately 60 degrees from a 30 degree outward angle to a 30 degree inward angle. With this arrangement a substantial surface of the carrier can be keyed i.e., a further 60 degrees for limiting the angular movement of the arm. With this arrangement there is still a substantial gap between the locking surfaces and

the outwardly extending keys. Basically, the keys are located at 90 degrees from the centerline on the locking surfaces.

The adjustable height armrest allows for both angular and height adjustment in a relatively simple manner and by means of a single lock arrangement. The lock arrangement when released automatically moves to a locked position.

Assembly of the armrest 2 can be appreciated from the exploded perspective views of Figures 2 and 8a. The armrest column 4 is inserted downwardly through the armrest carrier 6 and the outwardly projecting lugs 42 and 44 will bottom out on the bottom of slots 46 and 48 within the armrest carrier 6. The locking surfaces 38 and 40 of the column 4 are with the ports 28 of the carrier 6 and the locking members 26 are inserted. The compression spring 22, collar 20 and lock sleeve 18 are placed on the carrier 6. The collar 20 includes spring tabs 27 which have a snap fit with parts 29 of the carrier to lock the collar to the carrier. The lock sleeve 18 has internal lock tabs 60 which engage shoulders 61 of parts 63 in the carrier. The mounting plate 50 is mechanically secured to the bottom end 5 of the armrest support column. The arm support plate 10 is secured to the outwardly extending flange 71 of the carrier 6 and traps the support column 4 to the carrier 6.

Preferably the armrest support column 4 and the armrest carrier 6 are made from a reinforced plastic material. Similarly collar 20 and locking sleeve 18 can be of a molded plastic. The outer shape of the locking sleeve 18 and the collar 20 can vary to provide different visual designs. The longitudinal cavity of the armrest

carrier 6 includes bearing surfaces for maintaining alignment with the support column 4.

The adjustable armrest 2 provides excellent height and angle adjustment and can easily be modified for many different chair designs. The armrest has proven to be reliable in operation and has high structural integrity.

Although various preferred embodiments of the present invention have been described in detail, it will be appreciated by those skilled in the art that variations may be made without departing from the spirit of the invention or the scope of the appended claims.